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The Amount of Vehicle Operation Over 50 mph

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The Amount of Vehicle Operation over 50 MPH

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by

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Standards Development and Support Branch
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Office of Mobile Source Air Pollution Control
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16. Abstracts

Vehicle operational characteristics, especially driving speeds, affect fuel economy. When driving speed exceeds 45 mph, fuel economy decreases. This report presents current information on the amount of vehicle operation at speeds greater than 50 mph.

17. Key Words and Document Analysis. 17a. Descriptors

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Vehicle operation
Driving speed

17b. Identifiers/Open-Ended Terms

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17. COSATI Field/Group

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I. Introduction

It is a well known fact that vehicle operational characteristics, in particular vehicle driving speeds, are one of the factors that affect a vehicle's fuel economy. It has been found that as a vehicle's speed increases beyond 45 mph, its fuel economy decreases.[1] The purpose of this report is to combine and present all existing public information on the amount of vehicle operation at speeds greater than 50 mph. An extensive data search was conducted to gather information on the amount of miles travelled and time spent in these high speeds. These amounts are then compared to the same parameters calculated from the EPA dynamometer driving schedules.

II. Data Presentation

Three primary sources were used for gathering the vehicle speed information. These sources were: the Federal Highway Administration's Highway Statistics for 1974 and 1975; Scott Research Laboratories' Vehicle Operations Survey; and General Motor's Chase Car Survey. A summary of the data from each source is presented in the following sections.

A. Federal Highway Administration (FHwA)

The FHwA gathers its vehicle miles travelled and speed data from State highway departments. Therefore, the information presented in this section is based on statistics summarized for most states and in some cases for all the states in the nation. Tables 1 and 2 correspond to Table VS-1 from the 1974 and 1975 Highway Statistics[2]. Notice in particular the column that is heavily outlined. This column gives the percent of passenger cars exceeding 50 mph when the traffic is free-flowing, that is, the only obstacle for reducing their speed is the speed limit. If these percentages are weighed by the percent of Vehicle Miles Travelled (VMT) on these roads, we can then obtain a weighted average of the percent of vehicles exceeding 50 mph for the urban and rural roads, and for the U.S. total for free-flowing traffic. The weights were derived using the information in Tables 3 and 4 that correspond to the Highway Statistics' Table VM-2 for 1974 and 1975. These data and the computations performed for estimating the weighted averages can be found in Table 5. The averages are highlighted by a square box. These estimated averages do not include data for all the different FHwA road classifications since not all the road categories in Table VS-1 are the same categories that are found in Table VM-2. However, all the principal heavily travelled roads are included and these roads account for more than half of the total United States road mileage. In addition, the fact that not all the roads were included in the analysis is not likely to affect the calculated averages significantly since some roads left out were high speed roads and some were low speed roads. Therefore their effect on the average should cancel each other out. The road types that are not considered for the calculations are marked with an X on Tables 1 to 4.

Table 1

AVERAGE SPEEDS AND PERCENTAGES OF FREE-MOVING VEHICLES EXCEEDING VARIOUS SPEEDS, BY TYPE OF HIGHWAY – 1974[1]

Source: Program Management Division
Office of Highway Planning, FHWA

TABLE VM-1
OPTIONAL 1975

Area (50 States)	Type of Highway	Average Speed M.P.H.				Percent over 35 M.P.H.				Percent over 40 M.P.H.				Percent over 45 M.P.H.				Percent over 50 M.P.H.				Percent over 55 M.P.H.				Percent over 60 M.P.H.				Percent over 65 M.P.H.				Percent over 70 M.P.H.				Percent over 75 M.P.H.			
		All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus	All	P.C.	Tr.	Bus
X	Main Rural(1)(2)(3)	55.3	55.8	54.0	56.0	100	100	99	99	98	98	97	98	93	94	90	92	79	81	74	82	51	56	44	55	21	23	19	24	6	7	6	9	2	2	1	2	0	0	0	0
40	Rural Interstate Completed 1/ 2/	57.6	58.1	56.3	58.4	100	100	100	100	100	100	99	100	98	99	97	99	91	92	86	94	65	68	57	69	29	32	21	32	9	10	6	12	2	3	1	2	0	1	0	0
4	Rural U.S.-Traveled-way 1/ 2/ 3/	54.1	54.5	53.4	55.6	100	100	99	100	97	98	96	100	93	94	90	100	75	78	68	75	42	43	39	43	11	11	10	0	3	3	2	0	1	1	1	0	0	0	0	0
39	Rural Primary 1/ 2/	53.3	54.0	52.1	53.7	99	99	99	99	96	97	96	96	88	90	86	87	69	72	63	70	40	43	33	41	14	16	10	13	4	5	3	5	1	2	1	1	0	0	0	0
21	Urban Interstate Completed 1/ 2/	53.1	53.5	51.8	52.0	100	100	99	99	94	96	95	95	91	92	86	81	68	71	60	55	35	37	28	34	10	11	7	10	2	3	1	0	0	1	0	0	0	0	0	0
X	Suburban Interstate Completed...	55.8	55.8	53.6	56.2	100	100	100	100	100	100	99	100	97	99	93	100	65	69	57	86	40	53	27	64	14	16	9	19	3	3	1	5	0	1	0	0	0	0	0	0
	Freeways and Toll Roads:																																								
	Connecticut Parkways	57.5	57.9	-	-	100	100	-	-	100	100	-	-	100	100	-	-	94	94	-	-	70	70	-	-	16	16	-	-	3	3	-	-	0	0	-	-	0	0	-	-
	Connecticut Turnpike	57.8	58.0	57.1	59.6	100	100	100	100	100	100	100	100	100	100	100	100	92	92	92	100	59	61	52	78	23	25	18	39	5	6	2	0	1	1	0	0	0	0	0	0
	Maine Turnpike	58.9	-	-	-	100	-	-	-	100	-	-	-	100	-	-	-	96	-	-	-	77	-	-	-	40	-	-	-	13	-	-	-	3	-	-	-	1	-	-	-
	Michigan Freeways	59.5	60.2	56.6	59.6	100	100	100	100	100	100	100	100	99	99	98	100	94	96	89	93	77	81	61	80	41	46	21	40	14	16	3	7	3	4	0	0	1	1	0	0
	Nevada Freeways	60.8	61.6	58.9	62.6	100	100	100	100	100	100	100	100	99	100	99	100	97	98	96	100	86	89	79	100	58	62	48	79	26	30	18	35	11	13	4	8	4	5	1	0
	New Jersey Garden State Parkway	55.8	56.1	44.8	55.8	100	100	100	100	100	100	100	100	99	99	96	100	95	95	94	67	62	63	5	67	28	28	2	44	4	4	0	0	2	2	0	0	0	0	0	0
	New York Thruway	59.6	60.0	58.3	62.1	100	100	100	100	100	100	100	100	100	100	100	100	98	98	97	100	86	88	79	94	54	56	45	75	19	21	13	42	5	6	3	4	2	2	0	0
	Oregon Freeways	54.6	55.1	53.7	-	100	100	100	-	100	99	100	-	97	97	98	-	81	82	79	-	43	47	35	-	9	12	2	-	1	2	0	-	1	1	0	-	0	0	0	-
	Pennsylvania Freeways	48.3	49.1	46.1	46.4	98	98	96	91	88	91	79	88	66	70	54	62	37	41	23	22	15	18	7	7	3	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0
	Rhode Island Freeways (Rural)	57.9	58.2	56.0	55.7	100	100	100	100	99	99	98	100	89	90	81	86	66	70	60	57	29	31	19	29	11	12	6	7	2	2	0	0	1	1	0	0	0	0	0	0
	Rhode Island Freeways (Urban)	49.7	50.1	47.5	50.5	99	100	98	100	95	96	89	100	83	85	72	92	36	39	24	30	15	16	7	16	3	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0
	Texas-Ft. Worth-Dallas TPK	55.0	55.8	54.5	52.6	100	100	100	100	99	100	98	100	99	100	96	100	86	88	79	46	55	58	49	46	9	10	6	0	2	2	1	0	0	0	0	0	0	0	0	0
	Texas-Stemmons Freeway	56.0	56.2	53.3	53.1	100	100	100	100	100	100	99	100	98	98	97	100	76	78	69	78	40	41	36	22	6	6	4	0	1	1	1	0	0	0	0	0	0	0	0	0
20	Rural Secondary 1/ 2/	49.5	49.8	48.2	47.2	95	96	93	93	86	87	82	76	71	73	66	51	47	48	41	30	24	25	20	24	8	9	6	9	3	3	2	0	1	1	0	0	0	0	0	0
19	Urban Primary	42.3	42.5	41.1	41.0	73	74	69	66	57	58	52	54	40	42	36	33	24	25	20	16	10	11	7	9	3	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0
6	Urban Secondary	34.1	34.2	33.1	31.9	45	46	38	37	26	26	20	6	11	11	9	3	3	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
X	Suburban Primary	47.4	47.9	45.8	50.2	89	89	88	97	78	80	74	97	63	66	57	96	43	46	36	92	22	25	15	14	7	8	4	5	2	2	1	1	1	1	0	0	0	0	0	0

1/ Percentages for 70 M.P.H. are based on 39 States for Main Rural Roads, for Rural Primary, and for Rural Interstate Completed; 3 States for Rural Interstate Travelled-way; 21 States for Urban Interstate Completed; 19 States for Rural Secondary.
2/ Percentages for 75 M.P.H. are based on 31 States for Main Rural Roads, for Rural Primary, and for Rural Interstate Completed; 3 States for Rural Interstate Travelled-way; 16 States for Urban Interstate Completed; 12 States for Rural Secondary.
3/ Rural Interstate Travelled-way includes roads, and Urban Interstate Travelled-way included) streets that are adequate for present traffic but have not been upgraded to full Interstate design standards, and those older sections of existing roads and streets that are presently serving the Interstate traffic in Interstate corridors.
- Indicates data not available.

AVERAGE SPEEDS AND PERCENTAGES OF FREE-MOVING VEHICLES EXCEEDING VARIOUS SPEEDS, BY TYPE OF HIGHWAY – 1975

Table 2

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TABLE VB-1
AUGUST 1976

NO. OF STATES	TYPE OF HIGHWAY	AVERAGE SPEED MPH				PERCENT OVER 55 MPH				PERCENT OVER 60 MPH				PERCENT OVER 65 MPH				PERCENT OVER 50 MPH				PERCENT OVER 55 MPH				PERCENT OVER 60 MPH				PERCENT OVER 65 MPH				PERCENT OVER 70 MPH				PERCENT OVER 75 MPH			
		ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS	ALL	PsCs	TRs	BUS
X	MAIN RURAL(1)(2)	55.8	56.2	56.8	55.4	100	100	100	99	98	99	98	96	95	95	93	93	83	84	79	77	55	58	49	50	21	23	16	24	6	7	4	6	1	1	1	1	0	0	0	0
26	RURAL INTERSTATE COMPLETE(1)(2)	57.8	58.0	58.6	57.6	100	100	100	100	100	100	100	100	99	99	98	99	92	94	90	88	68	71	61	65	27	30	21	31	7	8	5	7	2	2	1	0	0	0	0	0
3	RURAL U.S. TRAVELED-WAY(1)(2)(3)	57.8	58.3	58.7	57.2	100	100	100	100	100	100	100	100	99	100	98	100	92	94	88	97	66	70	58	61	29	31	24	27	10	10	7	10	2	3	1	4	1	1	0	0
29	RURAL PRIMARY(1)(2)	54.0	55.1	53.4	54.2	100	100	99	99	94	98	94	96	92	93	89	90	76	79	70	72	47	50	40	42	17	18	13	19	5	6	3	6	1	1	1	1	0	0	0	0
15	URBAN INTERSTATE COMPLETE(1)(2)	56.7	59.2	53.8	56.1	100	100	100	100	99	99	99	100	95	96	93	99	78	80	72	69	48	51	41	50	13	15	10	7	3	3	1	0	0	0	0	0	0	0	0	0
X	SUBURBAN INTERSTATE COMPLETE(1)...	55.9	56.6	56.4	56.1	100	100	100	100	100	100	100	100	98	99	96	96	86	90	78	88	57	62	44	58	19	21	13	27	4	5	2	0	1	1	0	0	0	1	0	0
	FREEWAYS AND TOLL ROADS:																																								
	CONNECTICUT PARKWAYS	59.9	59.9	-	-	100	100	-	-	100	100	-	-	100	100	-	-	99	99	-	-	83	83	-	-	39	39	-	-	11	11	-	-	2	2	-	-	0	0	-	-
	CONNECTICUT TURNPIKE	58.1	58.2	57.5	57.7	100	100	100	100	100	100	100	100	100	100	100	100	97	97	97	97	75	76	73	73	23	24	18	20	3	4	2	2	0	1	0	0	0	0	0	0
	HIGHLAND FREEWAYS	58.3	59.0	55.2	61.9	100	100	100	100	100	100	100	100	100	100	98	100	94	96	86	100	73	77	55	75	34	38	15	75	7	9	2	25	1	1	0	0	0	0	0	0
	NEVADA FREEWAYS	57.3	57.2	57.6	-	100	100	100	-	99	99	100	-	99	99	99	-	94	95	94	-	71	71	71	-	31	30	34	-	9	9	10	-	2	3	2	-	0	0	0	-
X	NEW HAMPSHIRE TURNPIKE	59.2	59.2	60.0	52.7	100	100	100	100	100	100	100	100	100	100	100	100	97	97	100	33	82	80	100	33	35	34	33	0	10	10	9	0	1	1	0	0	0	1	0	0
	OREGON FREEWAYS	55.1	55.5	54.3	-	100	100	100	-	100	100	100	-	99	99	98	-	88	88	88	-	46	50	37	-	9	11	3	-	1	1	0	-	0	0	0	-	0	0	0	-
	PENNSYLVANIA FREEWAYS	51.9	52.9	50.2	53.3	100	100	99	100	96	99	97	98	88	91	83	90	64	71	53	75	30	37	20	44	7	10	3	10	1	1	0	0	0	0	0	0	0	0	0	0
	RHODE ISLAND FREEWAYS(RURAL)	54.9	55.1	53.8	55.2	100	100	100	100	99	99	100	100	95	95	97	100	75	76	69	85	50	52	42	46	13	15	7	15	5	5	1	0	1	1	0	0	0	0	0	0
	RHODE ISLAND FREEWAYS(URBAN)	50.5	50.7	49.7	51.7	100	100	100	100	96	96	99	100	87	86	90	100	45	48	32	79	19	21	10	36	2	3	0	7	0	1	0	0	0	0	0	0	0	0	0	0
	TEXAS-FT. WORTH-DALLAS TPK	52.4	52.7	50.6	52.6	100	100	99	100	100	100	96	96	97	96	89	89	64	72	47	67	25	26	17	26	2	2	1	4	0	0	1	4	0	0	0	0	0	0	0	0
	TEXAS-STEMMONS FREEWAY	55.7	55.9	54.1	53.6	100	100	100	100	100	100	100	100	99	99	99	99	87	89	82	70	52	55	41	33	8	8	6	5	1	1	1	0	0	0	0	0	0	0	0	0
15	RURAL SECONDARY(1)(2)	51.7	52.0	50.1	50.7	97	98	95	100	91	92	88	90	81	82	75	73	59	61	52	58	34	35	26	37	12	13	7	4	3	4	2	0	1	1	1	0	0	0	0	0
13	URBAN PRIMARY	42.0	42.9	42.0	43.3	75	76	76	76	55	56	55	59	36	39	37	45	22	23	19	24	11	12	8	11	3	4	1	3	1	1	0	1	0	0	0	0	0	0	0	0
2	URBAN SECONDARY	39.4	39.5	39.0	38.7	64	64	67	67	40	40	42	43	25	26	21	17	11	11	8	17	3	3	3	17	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
X	SUBURBAN PRIMARY	48.4	49.0	48.6	46.7	91	93	88	90	79	83	73	87	65	67	59	64	45	47	37	39	23	25	17	14	7	7	4	3	1	1	0	0	0	0	0	0	0	0	0	0

(1) PERCENTAGES FOR 70 MPH+ ARE BASED ON 20 STATES FOR MAIN RURAL ROADS, FOR RURAL PRIMARY, AND FOR RURAL INTERSTATE COMPLETED; 3 STATES FOR RURAL INTERSTATE TRAVELED-WAY; 15 STATES FOR URBAN INTERSTATE COMPLETED; 14 STATES FOR RURAL SECONDARY.
(2) PERCENTAGES FOR 75 MPH+ ARE BASED ON 20 STATES FOR MAIN RURAL ROADS, FOR RURAL PRIMARY, AND FOR RURAL INTERSTATE COMPLETED; 3 STATES FOR RURAL INTERSTATE TRAVELED-WAY; 14 STATES FOR URBAN INTERSTATE COMPLETED; 12 STATES FOR RURAL SECONDARY.
(3) RURAL INTERSTATE TRAVELED-WAY INCLUDES ROADS AND URBAN INTERSTATE TRAVELED-WAY INCLUDES STREETS THAT ARE ADEQUATE FOR PRESENT TRAFFIC BUT HAVE NOT BEEN UPGRADED TO FULL INTERSTATE DESIGN STANDARDS, AND THOSE LOWER SECTIONS OF EXISTING ROADS AND STREETS THAT ARE PRESENTLY SERVING THE INTERSTATE TRAFFIC IN INTERSTATE CORRIDORS.
– INDICATES DATA NOT AVAILABLE.

Highway Users

111-7

Source: U.S. Federal Highway Administration, Highway Statistics, 1975.

VEHICLE MILES, BY STATE AND HIGHWAY SYSTEM—1974

Table 3

Source: Program Management Division
Office of Highway Planning, FHWA

(In millions of miles)

TABLE VM-2
NOVEMBER 1975

FEDERAL HIGHWAY ADMINISTRATION REGION	STATE	FEDERAL-AID HIGHWAY SYSTEM																NOT ON FEDERAL-AID SYSTEM						
		INTERSTATE RURAL			INTERSTATE URBAN			TOTAL INTERSTATE	OTHER PRIMARY			SECONDARY												
		FINAL	TRAVELED WAY 1/	TOTAL RURAL	FINAL	TRAVELED WAY 1/	TOTAL URBAN		RURAL	URBAN	TOTAL	STATE RURAL	STATE URBAN	LOCAL RURAL	LOCAL URBAN	TOTAL	FEDERAL AID URBAN	TOTAL FEDERAL AID RURAL	TOTAL FEDERAL AID URBAN	TOTAL FEDERAL AID	OTHER STATE RURAL	OTHER STATE URBAN AND MUNICIPAL	LOCAL RURAL	LOCAL URBAN AND MUNICIPAL	TOTAL RURAL	TOTAL URBAN AND MUNICIPAL	TOTAL
		01	11		02	12			03	04		05	06	07	08		14				15	16	17	18			
REGION 1	Connecticut	819	268	1,087	2,777	459	3,236	4,303	1,296	1,880	3,176	1,051	979	6	40	2,006	1,106	3,430	7,172	10,578	254	1,436	286	5,438	1,960	14,045	16,005
	Maine	600	151	751	108	16	124	875	1,542	526	2,070	1,023	214	-	-	1,237	161	3,316	967	4,283	1,116	313	453	548	4,695	1,826	6,713
	Massachusetts	1,799	183	1,982	3,401	1,398	4,799	6,710	2,165	9,055	11,220	491	1,102	816	2,436	4,845	2,995	5,320	20,310	29,700	17	869	525	1,106	9,952	22,895	32,847
	New Hampshire	589	77	512	200	59	259	871	1,441	341	1,782	824	114	4	4	946	528	2,491	1,246	4,127	193	213	175	370	3,249	1,529	5,078
	New Jersey	986	108	1,094	3,795	946	4,741	5,835	3,020	6,060	9,080	66	56	1,738	1,757	3,617	6,998	10,649	28,697	45,346	183	484	4,253	14,995	21,085	44,177	65,262
	New York	3,384	302	3,686	6,953	409	7,362	11,048	8,753	13,435	22,188	2,420	1,961	1,790	1,343	7,514	4,572	16,649	28,697	49,346	51	63	122	1,102	914	4,630	5,544
	Rhode Island	140	21	161	866	79	945	1,106	112	1,055	1,367	247	23	-	23	274	759	761	3,465	4,206	67	3	210	362	2,415	609	3,024
	Vermont	523	37	560	48	8	56	615	315	278	1,193	489	15	176	13	691	-	2,138	362	2,500	67	3					
	Total	8,832	1,017	9,849	18,148	3,367	21,515	31,364	19,444	32,632	52,076	6,611	4,884	4,549	5,810	21,854	16,949	40,453	81,790	122,243	2,836	6,325	9,602	38,101	92,891	126,216	179,107
REGION 3	Delaware	144	(2/)	144	346	(2/)	346	490	981	583	1,564	417	238	-	-	655	447	1,542	1,614	3,156	-	-	126	193	1,668	1,807	3,475
	Dist. of Col.	-	-	-	268	158	426	426	-	1,065	1,065	-	-	-	552	552	-	-	2,063	2,063	-	-	-	894	-	2,957	2,957
	Maryland	1,482	-	1,482	3,332	430	3,762	5,244	3,563	3,671	7,234	1,826	1,600	305	685	4,416	164	7,376	9,682	17,058	540	72	1,308	2,724	11,418	12,478	23,896
	Pennsylvania	5,881	341	6,222	2,806	744	3,550	9,772	9,641	15,209	24,850	6,792	4,864	61	109	11,826	912	22,716	24,644	47,360	3,657	2,830	4,452	9,708	30,825	36,782	67,607
	Virginia	3,393	480	3,873	2,000	883	2,883	6,756	5,458	3,445	8,903	3,881	606	2,521	133	7,141	3,042	15,733	10,109	25,842	172	166	2,077	5,377	17,982	15,652	33,634
	West Virginia	1,028	371	1,399	257	125	382	1,781	2,222	1,398	3,620	1,572	270	1,197	73	3,112	82	6,390	1,905	8,295	22	150	650	1,001	9,062	3,056	10,118
	Total	11,908	1,192	13,120	9,029	2,340	11,369	28,489	21,865	25,371	46,936	14,488	7,578	4,084	1,352	27,702	4,647	53,757	50,017	103,774	4,391	2,818	10,807	19,897	68,955	72,732	141,687
REGION 4	Alabama	1,651	376	2,229	813	566	1,199	3,628	5,070	4,149	9,219	1,882	340	1,307	359	3,861	358	10,498	6,578	17,066	42	81	1,342	5,391	11,872	12,050	23,922
	Florida	3,710	1,275	4,985	2,742	1,186	3,928	8,913	6,872	3,292	10,154	4,956	2,230	1,508	537	9,651	10,997	18,741	20,934	39,675	1,420	1,172	3,889	15,872	24,043	37,978	62,021
	Georgia	4,186	683	4,869	3,427	112	3,539	8,408	6,909	2,325	9,234	3,473	413	1,979	613	6,478	331	17,230	7,241	24,471	93	534	2,539	7,649	19,862	15,280	35,142
	Kentucky	2,958	158	3,142	972	537	1,509	5,004	2,325	7,319	9,644	4,300	760	30	5,580	714	8,821	3,022	11,843	8	8	627	1,268	9,956	4,278	14,234
	Mississippi	1,551	120	1,671	443	353	796	2,467	4,697	1,061	5,758	1,107	107	1,446	344	3,004	340	20,557	8,839	29,396	1,881	647	40	3,030	22,480	12,148	35,000
	North Carolina	2,383	778	3,161	1,112	592	1,704	4,865	6,502	3,098	9,540	10,979	3,136	3	21	4,953	-	12,347	5,216	17,563	416	1,360	433	940	13,195	6,818	20,013
	South Carolina	2,256	860	3,116	799	30	829	3,355	6,132	3,123	9,255	3,426	1,332	173	22	4,953	-	12,347	5,216	17,563	68	5	2,841	6,674	13,341	15,215	28,556
	Tennessee	4,100	130	4,230	2,578	232	2,810	7,040	6,394	4,690	11,084	1,906	277	1,102	801	3,086	558	13,232	8,536	21,768	68	5	2,841	6,674	13,341	15,215	28,556
	Total	22,823	3,980	26,803	12,796	3,628	16,424	43,227	47,580	23,983	71,963	31,621	8,695	8,188	2,160	50,664	14,417	114,192	65,679	179,871	5,387	4,467	12,288	48,385	133,867	112,472	246,338
REGION 5	Illinois	4,277	768	5,045	6,667	495	7,162	12,207	8,464	10,091	18,555	844	1,141	1,932	734	4,651	3,847	16,285	22,975	39,260	1,098	2,471	2,694	13,694	20,078	39,140	59,218
	Indiana	4,125	122	4,247	2,701	273	2,974	7,221	6,794	2,714	9,508	3,581	1,098	1,977	325	7,381	4,768	16,899	11,879	28,778	140	99	1,379	6,597	18,418	18,575	36,993
	Michigan	3,306	117	3,423	5,023	1,076	6,099	9,522	6,811	7,398	14,209	1,756	301	6,621	1,177	10,057	12,136	18,693	27,521	46,214	24	50	3,105	6,366	21,828	33,987	55,749
	Minnesota	1,164	183	1,347	2,052	469	2,521	3,868	4,903	3,491	8,394	1,098	164	3,883	427	5,568	529	10,627	7,138	17,759	13	49	1,973	4,796	12,611	11,977	24,588
	Ohio	5,988	10	5,998	8,104	664	8,768	14,766	7,899	7,699	15,598	5,116	2,525	2,658	2,799	13,098	1,830	21,611	23,541	45,152	260	366	5,495	11,821	27,356	35,728	63,084
	Wisconsin	1,985	150	2,135	1,123	351	1,474	3,609	5,814	3,396	9,210	2,198	6	1,851	609	4,657	3,707	11,991	9,252	21,243	72	2	1,864	4,886	13,987	14,038	27,965
	Total	20,845	1,350	22,195	25,670	3,328	28,998	51,193	40,705	34,679	75,384	14,802	5,225	18,124	6,271	44,702	27,017	96,106	102,190	198,296	1,600	3,037	16,498	48,158	114,204	153,365	267,569
REGION 6	Arkansas	1,553	-	1,553	636	-	636	2,189	3,237	1,395	4,632	2,783	559	270	106	3,718	520	7,843	3,216	11,059	93	72	950	1,311	8,814	4,599	13,413
	Louisiana	1,404	489	1,893	1,269	99	1,368	3,261	2,868	1,994	4,862	4,261	1,065	1	-	5,329	2,400	9,105	6,827	15,932	944	556	1,612	699	11,463	8,668	19,131
	New Mexico	1,627	253	1,880	525	127	652	2,532	3,562	704	4,266	1,182	198	10	6	1,396	1,341	4,934	2,901	7,835	118	90	588	847	9,438	3,798	13,236
	Oklahoma	2,246	42	2,288	1,369	-	1,369	3,657	4,080	1,468	5,548	2,657	740	539	1,158	5,094	2,444	9,564	7,179	16,743	365	21	1,057	1,388	10,986	10,508	21,494
	Texas	6,315	1,114	8,029	9,788	467	10,255	18,284	12,259	9,427	21,686	8,845	3,140	-	-	11,985	6,355	29,133	29,177	58,310	1,583	753	3,451	10,599	30,167	44,524	74,691
	Total	13,745	1,898	15,643	13,587	693	14,280	29,923	26,366	14,988	39,374	19,728	5,702	822	1,270	27,522	13,060	60,579	49,300	109,879	3,105	1,452	7,458	20,759	71,172	71,511	142,683
REGION 7	Iowa	1,814	196	2,010	667	184	851	2,861	5,905	1,729	7,634	-	-	2,317	460	2,777	378	10,232	3,618	13,850	102	59	941	4,113	11,273	7,730	19,003
	Kansas	1,499	18	1,513	719	50	769	2,282	4,301	1,336	5,637	653	34	1,535	517	2,739	496	8,002	3,182	11,184	71	33	1,237	2,678	9,310	5,893	15,203
	Missouri	3,071	410	3,481	3,409	189	3,598	7,079	5,969	1,963	7,932	4,447	1,096	10	32	5,585	3,162	13,987	9,811	23,798	54	230	1,814	3,892	15,777	13,933	29,710
	Nebraska	1,163	-	1,163	368	20	388	1,551	3,064	826	3,890	600	15	842	113	1,570	409	5,669	1,747	7,416	9	-	665	2,854	6,339	4,601	10,940
	Total	7,543	624	8,167	5,163	443	5,606	13,773	19,239	5,904	25,143	5,700	1,085	4,704	1,122	12,611	4,641	37,810	18,358	56,168	232	322	4,659	13,537	42,701	32,157	74,858
REGION 8	Colorado	1,709	194	1,903	1,400	-	1,400	3,303	2,858	2,162	5,020	1,401	333	-	-	1,736	1,888	6,164	5,783	13,947	84	16	1,786	2,383	7,974	8,162	16,136
	Montana	772	335	1,107	67	-	67	1,174	1,668	862	2,530	92	-	379	1	472	430	3,246	760	4,006	-	-	1,235	682	4,351	1,842	6,193
	North Dakota	564	33	597	44	3	47	644	1,304	896	2,200	286	2	523	23	834	279	2,710	647	3,357	1	2	728	269	3,413	938	4,351
	South Dakota	815	143	958	34	5	39	997	1,966	307	2,273	305	-	476	12	793	114	1,905	472	2,377	29	2	560	325	4,054	999	5,053
	Utah	798	693	1,491	1,008	58	1,066	2,557	1,061	766	1,827	604	677	149	210	1,640	31	3,865	2,762	6,627	37	101	564	738	5,246	3,641	8,887
	Wyoming	564	111	1,075	36	8	44	1,119	1,013	93	1,106	273	7	17	3	300	186	2,379	133	2,711	2	1	361	357	3,761	498	3,452
	Total	5,582	1,509	7,091	2,607	68	2,675	9,766	9,870	5,086	13,956	2,963	1,019	1,544	249	5,775	2,988	21,268	10,757	32,025	83	122	5,248	4,974	26,499	15,893	42,392
REGION 9	Arizona	1,724	708	2,432	598	79	676	3,106	1,777	699	2,476	504	63	1,037	1,926	3,510	964	5,750	4,286	10,036	249	4	1,398	3,279	7,397	8,696	16,093
	California	6,454	1,218	7,672	17,644	3,581	20,625	28,297	11,635	23,882	35,517	2,923	891	4,000	4,845	12,659	24,508	26,230	79,752	100,981	264	55	12,500	13,836	38,926	127,600	166,526
	Hawaii	66	190	184	403	189	592	776	850	686	1,536	216	24	57	50	347	264	1,307	1,538	2,843	15	-	781	781	2,804	1,781	4,585
	Nevada	749	114	859	152	10	162	1,022	782	455	1,237	343	54	117	86	600	368	2,101	1,085	3,186	88	25	175	841	4,304	1,981	6,285
	Total	8,987	2,160	11,147	18,194	3,859	22,053	33,200	15,044	25,662	40,706	3,986	1,032	5,211	6,897	17,116	25,984	35,388	85,618	117,006	596	84	14,354	19,401	50,898	108,369	159,268
REGION 10	Alaska 3/	-	-	-	-	-	-	-	-	628	628	446	1,139	253	73	-	326	-	521	1,465	-	-	-	368	326	1,252	694	1,946
	Idaho	985	169	1,154	131	10	141	1,295	1,428	360	1,788	544	64	398	212	1,218	-	1,458	781	4,239	6	-	-	693	4,117	1,940	6,057
	Oregon	1,383	74	1,457	1,189	88	1,277	2,734	2,659	1,525	4,184	1,188	198	1,006	694	3,384	1,588	6,800	3,988	10,776	86	52	8,958	1,373	9,796	5,437	15,233
	Washington	1,275	732	2,007	3,133	202	3,335	5,342	3,029	3,890	6,919	1,183	799	1,647	1,605	4,630	1,588	7,866	10,813	18,679	86	4	1,830	2,846	9,788	12,863	22,651
	Total	4,123	975	5,048	4,453	300	4,753	9,801	7,801	6,283	14,024	3,168	1,432	3,051	1,911	9,562	1,588	19,068	15,907	34,975	78	56	5,741	4,780	24,809	20,693	45,502
U. S. Total		104,408	14,655	119,063	109,647	18,086	127,673	246,736	205,734	173,038	378,762	103,147	36,652	50,677	27,032	217,508	111,232	478,421	479,416	954,237	18,868	18,685	86,595	211,872	383,496	766,171	1,149,649

1/ Traveled-way includes travel on highways in the Interstate system status of completion group 2. This group consists of mileage which is adequate for present traffic but will need further construction and improvement to bring it to full Interstate standards. In some instances there are divided highways with full control of access and in others they are two-, three-, or four-lane undivided highways with no access control.

2/ Travel on Delaware's Interstate traveled-way, systems 01 and 02, is included in the figure for Interstate Final.

3/ Estimate of total travel provided by the State highway department. Distribution by highway system made by the Federal Highway Administration based on data for 1973.

VEHICLE MILES, BY STATE AND HIGHWAY SYSTEM – 1975

Table 4

(In millions of vehicle miles and vehicle kilometres)

Source: Highway Statistics Division
Office of Highway Planning, FHWA

TABLE VM-2
JANUARY 1977

FEDERAL HIGHWAY ADMINISTRATION REGION	STATE	FEDERAL-AID HIGHWAY SYSTEM																		NOT ON FEDERAL-AID SYSTEM				TOTAL RURAL	TOTAL URBAN AND MUNICIPAL	TOTAL
		INTERSTATE RURAL			INTERSTATE URBAN			TOTAL INTERSTATE	OTHER PRIMARY			SECONDARY					FEDERAL AID URBAN	TOTAL FEDERAL AID			OTHER STATE RURAL	OTHER STATE URBAN AND MUNICIPAL	LOCAL RURAL	LOCAL URBAN AND MUNICIPAL			
		RURAL	TRAVELED WAY 1/	TOTAL RURAL	RURAL	TRAVELED WAY 1/	TOTAL URBAN		RURAL	URBAN	TOTAL	STATE RURAL	STATE URBAN	LOCAL RURAL	LOCAL URBAN	TOTAL		RURAL	URBAN	TOTAL							
		01	11		02	12			01	06		05	06	07	08		14				09	10	11	12			
REGION 1	Connecticut	507	246	801	1,410	504	1,914	4,717	1,089	2,350	1,439	975	-	15	-	990	5,749	8,882	12,013	14,895	276	991	315	1,757	3,473	16,961	18,434
	Maine	639	162	801	121	16	137	938	1,579	522	2,101	1,045	220	-	-	1,265	122	1,425	1,001	4,426	1,145	320	467	358	5,237	1,879	6,916
	Massachusetts	1,553	34	1,587	4,935	98	5,033	6,620	2,200	8,810	11,010	430	1,170	870	2,500	5,010	2,900	5,127	20,413	25,540	60	1,950	410	1,840	9,597	23,503	29,100
	New Hampshire	629	26	655	214	62	276	931	1,461	358	1,146	851	77	15	3	975	611	2,998	1,325	4,323	202	207	181	377	3,381	1,909	5,290
	New Jersey	1,066	117	1,183	3,945	704	4,649	5,832	3,093	6,611	9,704	67	-	1,649	-	1,716	12,034	5,992	23,294	29,286	1,010	3,154	3,154	11,891	10,156	38,269	48,445
	New York	3,693	319	4,012	6,864	436	7,300	11,312	9,793	11,532	20,885	253	430	19	209	977	671	840	1,826	4,666	51	67	112	764	1,003	4,657	5,660
	Rhode Island	145	22	170	872	87	959	1,159	338	1,461	1,759	510	16	190	13	729	28	2,310	376	2,706	75	2	304	727	2,709	685	3,394
	Vermont	610	44	654	46	9	55	709	976	264	1,240																
	Total	8,845	1,020	9,865	20,437	1,916	22,353	32,218	20,116	11,968	52,084	6,848	3,249	4,648	3,734	18,479	27,657	41,477	88,961	130,438	3,067	6,964	9,411	32,803	53,995	126,128	180,087
REGION 3	Delaware	198	(2/)	198	194	(2/)	194	392	1,075	521	1,596	474	229	-	-	703	453	1,657	1,597	3,254	-	-	174	197	1,831	1,794	3,625
	Dist. of Col.	-	-	-	119	172	491	491	-	1,072	1,072	-	-	-	570	570	-	-	2,133	2,133	-	-	-	240	-	2,133	2,133
	Maryland	1,500	-	1,998	3,451	464	3,915	5,913	3,794	3,973	7,767	2,019	1,701	525	504	4,749	-	171	7,986	10,764	450	-	70	1,642	2,834	12,018	14,852
	Pennsylvania	6,784	747	8,384	2,403	615	2,918	9,924	10,205	8,846	19,101	6,913	4,977	63	110	12,111	7,198	24,217	24,779	48,496	1,781	2,681	2,401	6,137	10,401	33,799	44,200
	Virginia	3,370	526	4,152	2,342	584	2,926	7,078	5,619	3,528	9,147	4,050	463	2,684	129	7,222	3,267	16,425	10,309	26,734	162	169	2,306	5,230	18,893	15,741	34,634
	West Virginia	1,018	146	1,164	411	150	561	1,725	2,936	1,168	3,804	1,676	316	1,209	74	3,275	83	6,525	2,202	8,727	22	152	657	1,012	7,284	3,366	10,650
	Total	13,079	919	14,038	9,220	2,005	11,225	25,263	23,149	19,150	42,307	15,142	7,706	4,481	1,393	28,652	11,112	56,750	50,754	107,504	4,417	3,074	9,182	16,599	70,349	70,497	140,846
REGION 4	Alabama	1,758	627	2,385	887	601	1,488	3,873	5,196	3,954	9,150	1,949	388	1,406	339	4,082	559	10,930	6,728	17,666	46	401	1,344	5,381	12,326	12,510	24,836
	Florida	3,944	1,378	5,322	2,961	1,043	4,004	9,326	7,361	3,604	10,969	5,531	2,379	2,087	577	10,564	9,968	20,295	20,532	40,827	1,373	1,148	4,117	14,290	25,785	35,930	61,715
	Georgia	4,662	813	5,475	1,196	310	1,506	6,981	7,291	3,040	10,331	3,839	473	1,333	487	6,732	410	18,538	7,796	26,334	95	470	3,196	9,016	31,990	17,886	49,876
	Kentucky	2,753	321	3,174	1,011	466	1,477	4,751	4,947	2,478	7,425	4,479	1,065	264	91	5,899	621	12,964	5,834	18,698	1,544	696	1,256	3,496	15,634	9,054	24,688
	Mississippi	1,469	130	1,599	450	342	792	2,391	4,759	1,053	5,812	1,150	109	1,518	355	3,132	1,094	9,076	3,603	12,679	10	9	673	1,237	9,709	4,849	14,558
	North Carolina	2,539	692	3,231	1,260	565	1,825	5,056	6,564	3,157	9,721	11,072	1,506	7	21	14,606	1,094	20,874	9,803	30,677	1,835	687	846	3,155	22,955	13,445	36,400
	South Carolina	2,622	192	2,814	418	28	446	3,260	6,221	3,335	9,556	1,497	1,276	166	21	4,970	-	12,690	5,238	17,928	435	1,415	486	349	13,551	7,858	21,409
	Tennessee	4,091	111	4,202	2,447	233	2,680	6,882	6,775	3,998	10,773	1,618	275	1,218	214	3,325	1,585	13,813	8,752	22,565	121	233	2,770	7,237	16,704	16,220	32,924
	Total	23,839	4,254	28,192	12,730	3,608	16,398	44,590	49,122	24,619	73,741	33,125	9,481	8,599	2,105	53,318	15,333	119,038	67,936	186,974	5,460	5,061	14,158	43,147	138,656	116,144	254,800
REGION 5	Illinois	4,594	617	5,211	7,014	438	7,452	12,663	8,522	10,524	19,046	761	1,208	1,912	518	4,699	3,864	16,926	23,766	40,692	1,012	2,422	2,749	14,469	20,185	40,727	60,912
	Indiana	4,165	121	4,286	2,727	276	3,003	7,291	6,761	2,761	9,602	3,300	1,109	1,999	328	7,336	4,815	17,068	11,996	29,064	141	100	1,391	6,661	18,600	18,750	37,350
	Michigan	3,735	168	3,903	5,712	1,176	6,888	10,791	7,592	6,329	13,921	1,843	198	6,550	70	8,655	16,016	19,888	29,495	49,383	29	64	2,985	5,712	32,502	25,273	58,175
	Minnesota	1,366	125	1,491	2,249	488	2,737	4,228	5,615	3,162	8,777	1,221	137	1,848	289	3,545	3,763	10,225	10,248	20,313	22	44	1,228	4,037	11,475	14,149	25,624
	Ohio	6,767	4	6,771	8,952	349	9,301	15,572	8,637	6,475	15,112	6,177	1,960	2,641	2,575	13,343	2,804	23,716	23,119	46,831	266	378	5,546	11,121	29,509	34,606	64,114
	Wisconsin	2,144	136	2,280	1,127	243	1,370	3,650	6,088	3,307	9,395	2,222	47	1,854	663	4,786	3,165	12,364	8,498	20,862	76	2	2,002	5,648	14,442	14,142	28,584
	Total	22,771	1,191	23,964	27,781	2,970	30,751	54,215	43,235	32,538	75,773	16,004	4,653	16,804	4,683	42,324	34,427	99,687	107,052	206,739	1,545	3,002	15,901	47,630	127,133	157,686	284,819
REGION 6	Arkansas	1,496	-	1,496	671	-	671	2,257	3,116	1,434	4,750	2,978	592	278	94	3,809	701	8,058	1,459	11,517	100	71	1,001	1,254	9,159	4,705	13,863
	Louisiana	1,757	211	1,968	1,378	68	1,446	3,414	3,089	2,001	5,090	4,909	1,141	-	-	1,342	1,567	5,194	3,064	8,258	130	49	617	797	5,941	3,994	9,935
	New Mexico	1,813	214	2,027	524	98	622	2,649	1,928	780	2,708	1,228	96	11	7	1,342	568	4,972	9,944	7,489	17,433	366	31	1,090	1,784	11,439	11,394	22,833
	Oklahoma	2,187	-	2,187	1,341	83	1,424	3,611	4,842	997	5,839	2,817	52	568	44	3,481	4,972	9,944	7,489	17,433	366	31	1,090	1,784	11,439	11,394	22,833
	Texas	7,988	996	8,824	10,436	375	10,811	19,635	12,809	10,464	23,273	10,006	2,081	-	-	12,089	9,797	11,639	33,155	64,794	1,746	139	1,626	14,077	37,811	49,571	87,382
	Total	15,241	1,111	16,352	14,350	616	14,966	31,688	25,384	15,676	41,060	21,338	3,931	857	145	26,271	19,158	64,301	53,876	118,177	3,359	790	7,817	21,389	75,497	75,999	150,496
REGION 7	Iowa	2,041	42	2,143	716	174	890	3,033	6,060	1,733	7,793	-	-	-	473	2,206	473	2,467	723	10,597	3,819	14,416	100	165	949	4,023	11,646	7,987	19,633
	Kansas	1,507	19	1,526	746	52	798	2,324	4,302	1,429	5,731	653	35	1,560	506	2,754	620	8,041	3,305	11,479	61	36	1,226	2,735	9,328	6,157	15,485
	Missouri	1,130	307	1,437	4,209	188	4,397	7,834	5,768	2,293	8,061	3,737	924	12	12	4,745	4,470	13,814	12,096	25,910	45	213	1,819	3,452	16,898	15,777	32,675
	Nebraska	1,297	1	1,298	910	15	925	1,683	3,095	834	3,929	606	15	850	99	1,570	437	5,839	1,780	7,619	5	-	684	2,303	6,528	4,683	11,211
	Total	7,975	419	8,394	6,051	429	6,480	14,874	19,225	6,289	25,514	5,056	974	4,816	1,090	11,936	6,250	37,491	21,083	58,574	211	412	4,698	13,189	42,400	34,600	77,000
REGION 8	Colorado	1,802	215	2,157	1,582	-	1,582	3,539	2,912	2,170	5,082	1,427	350	-	-	1,777	1,994	6,496	5,826	12,322	22	30	1,777	2,438	8,295	8,322	16,597
	Montana	784	333	1,117	67	-	67	1,184	1,673	260	1,933	-	-	471	-	471	434	1,961	761	4,222	-	-	1,076	625	4,337	1,386	5,723
	North Dakota	614	30	644	49	3	52	696	1,424	265	1,689	299	3	518	24	834	276	2,275	620	3,495	1	2	715	289	3,538	911	4,449
	South Dakota	868	134	992	46	5	51	1,043	1,739	311	2,050	300	-	479	-	779	356	1,510	712	4,222	27	2	512	297	4,049	1,011	5,060
	Utah	1,096	337	1,433	1,093	77	1,170	2,603	3,007	215	3,222	531	142	135	39	847	2,126	3,096	3,642	6,738	31	11	900	644	3,687	4,339	7,926
	Wyoming	1,070	96	1,166	40	8	48	1,214	1,093	94	1,187	281	-	16	-	297	842	2,556	384	2,940	5	1	180	346	2,931	731	3,662
	Total	6,114	1,185	7,499	2,671	43	2,714	10,213	9,848	3,315	13,163	2,838	495	1,619	63	5,005	5,358	21,798	11,945	33,739	86	54	4,970	4,657	26,850	16,696	43,546
REGION 9	Arizona	2,328	578	2,906	564	184	748	3,654	1,964	563	2,527	715	43	838	333	1,929	4,747	6,421	6,434	12,855	387	6	711	2,092	7,523	6,468	13,991
	California	6,596	1,027	7,623	18,927	3,254	22,081	29,704	11,602	20,770	32,372	2,841	350	4,053	1,067	8,311	35,541	26,169	79,809	105,978	236	129	11,331	14,866	37,796	94,804	132,600
	Hawaii	91	103	194	429	176	605	799	950	605	1,555	244	53	68	67	432	568	1,496	1,898	3,394	16	-	790	496	1,762	2,384	4,146
	Nevada	503	123	626	164	10	174	1,100	795	328	1,123	170	60	126	96	662	435	2,277	1,093	3,370	11	21	189	878	2,447	1,992	4,439
	Total	9,818	1,831	11,649	20,084	3,524	23,608	35,257	15,311	22,266	37,577	4,230	506	5,085	1,563	11,334	41,291	36,275	89,234	125,509	670	156	12,581	18,252	49,528	107,648	157,176
REGION 10	Alaska 3/	-	-	-	-	-	-	-	740	438	1,178	320	87	-	-	407	-	1,060	525	1,585	-	-	468	527	1,588	1,088	2,676
	Idaho	937	174	1,111	154	10	164	1,275	1,327	185	1,512	667	39	827	23	1,147	692	3,532	1,084	4,616	6	-	513	738	4,891	1,888	6,779
	Oregon	2,072	38	2,110	1,215	121	1,336	3,446	2,782	1,522	4,304	1,279	163	1,151	796	3,329	-	7,892	3,817	11,099	58	60	3,172	3,595	15,466	5,430	20,896
	Washington	1,332	764	2,096	1,458	272	1,674	3,770	3,187	2,152	5,339	1,298	850	1,728	1,054	4,930	1,676	8,259	9,416	17,675	21	5	1,580	4,048	20,300	13,893	34,193
	Total	4,341	976	5,317	4,854	353	5,194	10,531	8,046	4,297	12,343	3,964	1,110	3,386	1,873	9,753	2,368	20,133	14,842	34,975	79	65	6,093	7,888	42,265	29,189	67,454
U. S. Total - Miles		121,972	13,168	135,140	118,225	15,464	133,689	268,829	213,436	160,136	373,562	108,165	32,105	58,805	16,639	207,114	161,154	496,946	305,733	1,008,659	18,894	19,582	86,798	225,140	650,631	729,443	1,380,074
U. S. Total - Kilometres		196,301	21,190	217,491	190,265	24,887	215,152	416,643	343,492	257,698	601,190	174,075	51,668	80,797	26,778	333,318	259,377	799,757	491,866	1,623,623	30,407	31,514	139,658	362,572	1,047,251	1,173,894	2,221,145

1/ Traveled-way includes travel on highways in the Interstate System status of completion group 2. This group consists of mileage which is adequate for present traffic but still need further construction and improvement to bring it to full interstate standards. In some instances these are divided highways with full control of access and in others they are two-, three-, or four-lane undivided highways with no access control.

2/ Travel on Delaware's Interstate traveled-way, systems 01 and 02, is included in the figure for Interstate Rural, Systems 01 and 02.

3/ Estimate of total travel provided by the State highway department. Distribution by highway system made by the Federal Highway Administration based on data for 1976.

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Table 5

Estimate of the Percent of Passenger Cars Exceeding 50 mph for Free-Flowing Traffic by Area and Road Classification for 1974 and 1975

Urban

Road Type	1974 VMT*	Weight	% P.C. Over 50 mph*	Weight x Percent	1975 VMT*	Weight	% P.C. Over 50 mph	Weight x Percent
Urban Interstate Completed	109,647	.316	71	22.4	118,225	.361	80	28.9
Urban Primary	173,028	.500	25	12.5	160,126	.490	23	11.3
Urban Secondary	63,684	.184	3	.6	48,744	.149	11	1.6
Total	346,359	1.000		35.5	327,095	1.000		41.8

Rural

Rural Interstate Completed	104,408	.218	92	20.1	111,972	.225	94	21.2
Rural Interstate Travelled-Way	14,655	.031	78	2.4	13,168	.027	94	2.5
Rural Primary	205,734	.430	72	31.0	213,436	.429	79	33.9
Rural Secondary	153,824	.321	48	15.4	158,370	.319	61	19.5
Total	478,621	1.000		68.9	496,946	1.000		77.1

* Source: U.S. Federal Highway Administration, Highway Statistics, 1974 and 1975.

Table 5 (cont)

U.S. Total

Road Type	1974 VMT	1974 Weight	1974 % P.C. Over 50 mph	1974 Weight x Percent	1975 VMT	1975 Weight	1975 % P.C. Over 50 mph	1975 Weight x Percent
Urban Interstate Completed	109,647	.133	71	9.4	118,225	.144	80	11.5
Urban Primary	173,028	.210	25	5.3	160,126	.194	23	4.5
Urban Secondary	63,684	.077	3	.2	48,744	.059	11	.6
Rural Interstate Completed	104,408	.127	92	11.7	111,972	.136	94	12.8
Rural Interstate Travelled-Way	14,655	.018	78	1.4	13,168	.016	94	1.5
Rural Primary	205,734	.249	72	17.9	213,436	.259	79	20.5
Rural Secondary	153,824	.186	48	8.9	158,370	.192	61	11.7
Total	824,980	1.000		54.8	824,041			63.1

The calculated averages for the U.S. total found in Table 5 (54.8% in 1974 and 63.1% in 1975) therefore indicate that for free-flowing traffic in the United States, a significant number of the passenger cars travelled at a speed greater than 50 mph during both 1974 and 1975. The large amount of travel at these high speeds therefore is increasingly important because of its significant impact on the nation's overall vehicle speed pattern and primarily on its fuel economy.

Another useful piece of information that can be estimated from Tables 1 thru 4 is the percent of urban, rural, and total U.S. VMT at speeds greater than 50 mph. These percentages provide a more accurate picture of the amount of travel done in excess of that speed. In order to estimate these average percentages, applied probability statistics computations were needed. The assumptions and modeling required to derive the following equation can be found in Reference 3.

$$\%\ VMT/_{>50mph} = \frac{VMT_1 \times p_1(>50) + VMT_2 \times p_2(>50) + \ldots + VMT_n \times p_n(>50)}{VMT_1 + VMT_2 + \ldots + VMT_n} \times 100$$

where

VMT_i = Vehicle Miles travelled on road type i

$p_i\ (>50)$ = Percent of passenger cars travelling at speeds greater than 50 mph on road type i

For calculation of the % Urban VMT/>50 mph and % Rural VMT/>50 mph, the VMT_i's and p_i's would be those corresponding to the urban or rural areas only. The road classifications used were the same ones used for the previous analysis. The resulting percentages are presented in Table 6. The % VMT at other speeds were also calculated and are presented in histogram form on Figures 1 to 3.

Table 6

Percent of Vehicle Miles Travelled in Excess of 50 mph

Area	1974	1975
Urban	35.5%	41.8%
Rural	68.8	77.0
U.S. Total	54.8	63.1

The percentages probably increased consistently for the urban and rural area in 1975 because 1974 was the first year when the maximum speed limit was reduced to 55 mph. Drivers were most probably more aware of their speed in 1974 because of the new adjustment. Data for 1976 is

Percent of Miles Spent in Speed Bands
For Free-Flowing Traffic

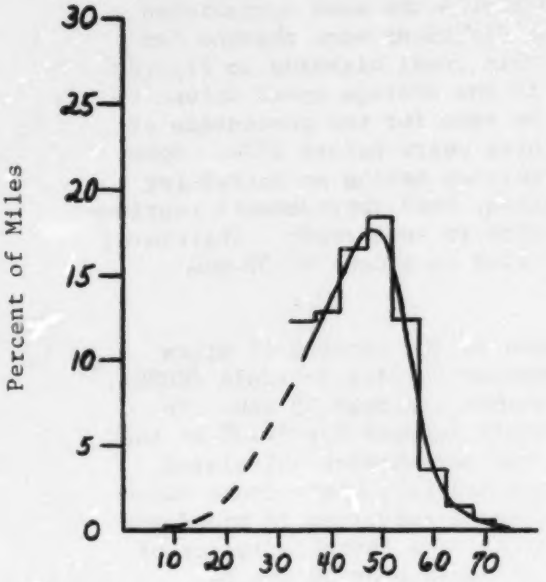

Figure 1
Urban Driving

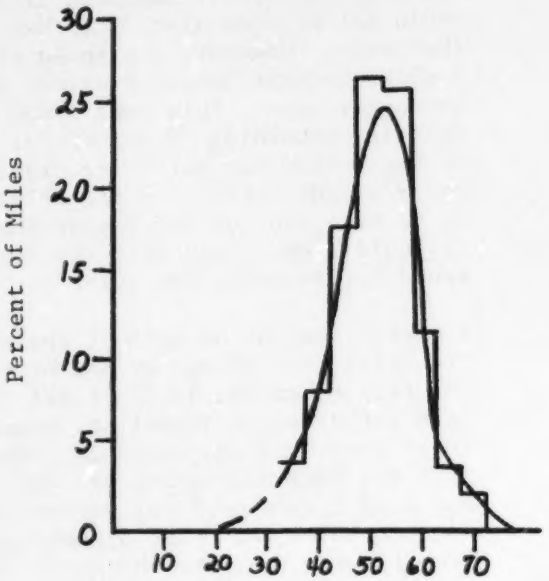

Figure 2
Rural Driving

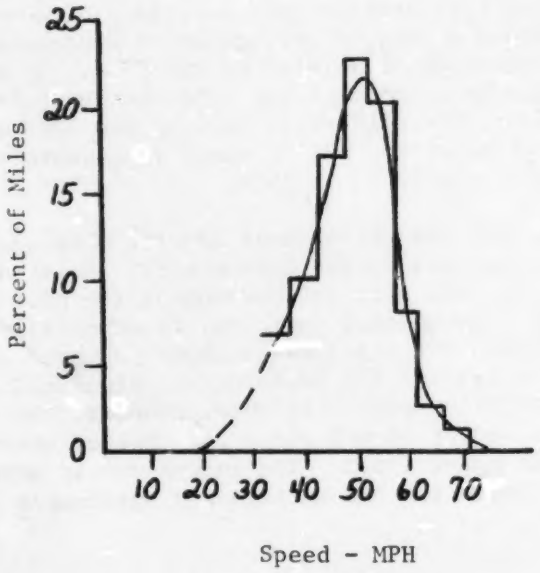

Figure 3
U.S. Driving

Source: U.S. Federal Highway Administration, Highway Statistics, 1974 and 1975.

still not available and even if it were available the same comparisons could not be made since the FHwA road classifications were changed for that year. However, the speed trends for main rural highways in Figure 4 show a slight increase almost each year in the average speed driven by passenger cars. This same trend can also be seen for the percentage of vehicles exceeding 50 mph except for the three years before 1974. Some of this trend can partly be explained by vehicles having an increasing power/weight ratio up until 1970. In addition, road improvements continue to be made thereby increasing the speed limits in some roads. Therefore, it would seem likely that the amount of driving in excess of 50 mph would not decrease for 1976.

A comparison can be made of these percentages to the percent of miles travelled over 50 mph by the Highway Dynamometer Driving Schedule (HDDS).[4] For this schedule, 46.5% of all the speed points are over 50 mph. In terms of distance travelled, these speed points account for 54.0% of the total length of the schedule. Recall that the percentages calculated from the FHwA statistics are for free-flowing traffic, where stops signs and stop lights or other factors that can cause a reduction in speed are not accounted for. The highway cycle has these same characteristics of free-flowing movement, however, its amount of speed over 50 mph is significantly less than the U.S. percent of VMT exceeding that speed for 1975 (63.1%). The difference is even larger than the numerical difference between 54.0% and 63.1% for 1975 since this last percentage includes free-flowing traffic within the city where the speed travelled at is much slower than on highways outside the city.

It would be more accurate to compare the HDDS percentage to the results for the FHwA Rural Highways. The HDDS was actually constructed by driving an instrumented test vehicle over a variety of non-urban roads and highways reflecting the correct proportion of vehicle operation over four main rural road types as classified by the FHwA. It was designed in this manner in order to complement the UDDS that characterizes urban driving only. Therefore, the difference between the HDDS and FHwA data is even larger since 68.8% of the VMT in rural roads were travelled in excess of 50 mph in 1974 and 77.0% in 1975.

Therefore, it appears that the EPA highway driving schedule does not include sufficient current real-world high speeds. This is in most part due to the fact that the data used for developing the HDDS was collected in 1974 by driving the instrumented test vehicle on rural roads in the southeast part of Michigan and a freeway segment in northern Ohio. The vehicle was driven by a trained EPA employee who simulated as much as possible the general traffic speed. In Ohio, however, the driver purposely maintained a maximum speed of 55 mph since the freeway travelled on was already subject to that speed limit. The intent was to develop a rural driving schedule that reflected the anticipated nationwide 55 mph speed limit.

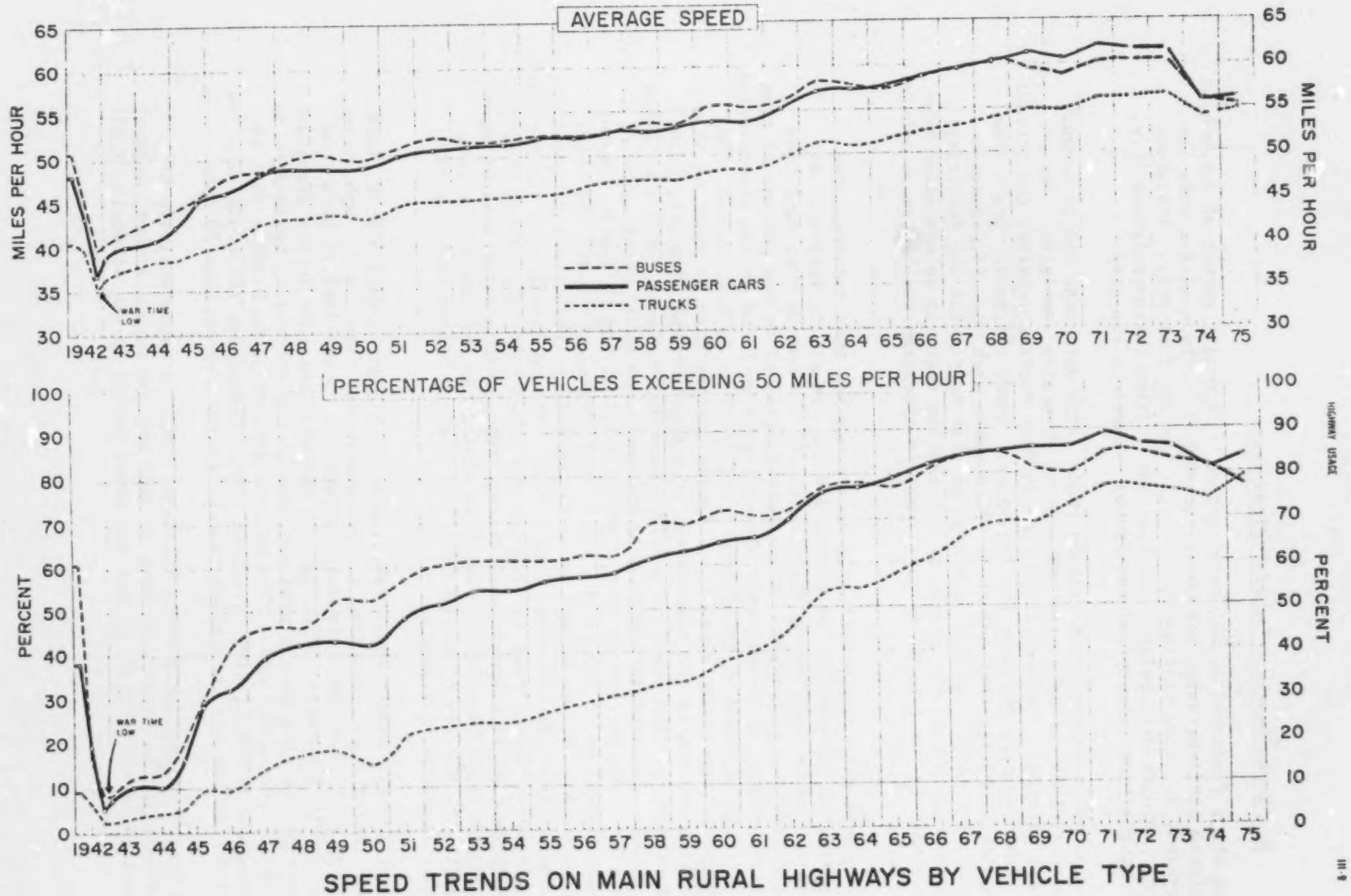
AVERAGE SPEED
MILES PER HOUR
MILES PER HOUR
BUSES
PASSENGER CARS
TRUCKS
WAR TIME LOW
1942 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75
PERCENTAGE OF VEHICLES EXCEEDING 50 MILES PER HOUR
PERCENT
PERCENT
WAR TIME LOW
1942 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75
SPEED TRENDS ON MAIN RURAL HIGHWAYS BY VEHICLE TYPE

Figure 4

Source: U.S. Federal Highway Administration, Highway Statistics, 1974 and 1975.

B. Scott Research Laboratories, Inc.

The study conducted by SRL consisted of a five-city survey of automobile driving patterns using the chase car method.[5] These cities were Los Angeles, Houston, Cincinnati, Chicago, and New York City. Therefore, their results will reflect metropolitan driving characteristics only, including both freeway and non-freeway travel in the city.

One of SRL's approaches to reduce their large data base was to prepare mode-matrices for each city and for the five-city composite. One of these matrices, the Normalized Time in Mode Matrix, provides the percent of vehicle operating time for 196 modes. These 196 modes result from the matrix having that amount of cells where each cell represents a particular mode. Table 7 is a copy of that matrix for the five-city composite. One of the pieces of information that can be extracted from the table is the percent of total vehicle operation time above 50 mph in the city.

The matrix is a little confusing on its own and thus requires some explanation in order to understand how the percent is derived. All cruises can be found along the diagonal of the matrix that runs from upper left to lower right. If we were interested in the percent of time spent cruising at 55 mph, that percent would be found at the intersection of an initial speed of 55 mph and final speed of 55 mph, 1.806%. The percent of time spent cruising at speeds greater than or equal to 55 mph would be the sum of the last three percentages on the diagonal, 6.166%. The percent of time spent in accelerations can be found above the cruise diagonal. An acceleration from 30 mph to 55 mph would occur .038% of the time. The percent of time spent in accelerating to speeds greater than or equal to 55 mph is the sum of the percentages under the final speeds of 55, 60, and 65 mph up until the figures before the diagonal cruises. This percent adds up to 1.972%. For decelerations, the procedure is the same, except that the figures are found below the cruise diagonal. The percent of time spent decelerating from speeds greater than or equal to 55 mph would then be calculated by adding the figures on the rows next to 55, 60, and 65 mph up until the figures before the diagonal. This percentage is 1.820%

Except for the lowest speed, zero, and the highest speed, 65 mph, each speed includes all data from 2.5 mph below that speed to 2.5 mph above that speed. Therefore, the calculations for 55 mph include data from 52.5 mph to 57.5 mph. If we add the calculations made in the previous paragraph, we then have a good estimate of the percent of total time in operation above 52.5 mph. This percent adds up to be 9.958%, that is, approximately 10% of city operation time. Therefore, 10% would be a low estimate of the city operation time in speeds greater than 50 mph.

The Urban Dynamometer Driving Schedule (UDDS) is representative of metropolitan Los Angeles driving in 1969 and contains a freeway segment travelled in the city.[6] Of all the speed points in the schedule, 3.87%

SCOTT RESEARCH LABORATORIES, INC

Table 7

COMPACTED NORMALIZED TOTAL TIME MATRIX FOR 5-CITY COMPOSITE

INITIAL SPEED, MPH	FINAL SPEED, MPH													
	0	5	10	15	20	25	30	35	40	45	50	55	60	65
0	13.060	0.582	0.559	0.668	1.025	1.891	2.631	2.314	1.321	0.501	0.140	0.052	0.018	0.010
5	0.577	0.746	0.283	0.253	0.299	0.442	0.506	0.427	0.236	0.092	0.028	0.012	0.006	0.002
10	0.419	0.287	0.768	0.345	0.422	0.546	0.519	0.381	0.141	0.051	0.021	0.013	0.007	0.005
15	0.505	0.207	0.303	0.941	0.509	0.589	0.542	0.425	0.244	0.091	0.031	0.023	0.018	0.027
20	0.943	0.286	0.298	0.401	1.633	0.878	0.641	0.357	0.167	0.059	0.030	0.023	0.015	0.008
25	1.829	0.454	0.395	0.465	0.725	3.518	1.246	0.541	0.224	0.083	0.037	0.031	0.024	0.020
30	2.419	0.488	0.441	0.471	0.560	1.136	5.463	1.228	0.354	0.119	0.048	0.038	0.022	0.024
35	2.142	0.394	0.349	0.380	0.311	0.493	1.103	5.255	0.857	0.228	0.066	0.030	0.014	0.017
40	1.267	0.204	0.158	0.182	0.152	0.193	0.318	0.775	3.450	0.483	0.145	0.063	0.028	0.019
45	0.477	0.087	0.064	0.074	0.065	0.072	0.114	0.214	0.443	2.027	0.340	0.134	0.054	0.015
50	0.160	0.026	0.031	0.022	0.027	0.034	0.035	0.059	0.128	0.319	1.535	0.330	0.107	0.040
55	0.085	0.012	0.013	0.011	0.013	0.018	0.023	0.032	0.061	0.109	0.319	1.806	0.324	0.107
60	0.043	0.013	0.006	0.005	0.006	0.007	0.010	0.020	0.020	0.053	0.109	0.323	2.069	0.292
65	0.037	0.014	0.005	0.001	0.002	0.001	0.002	0.008	0.010	0.016	0.031	0.098	0.284	2.291

NORMALIZED MODE MATRIX SUMMARY

PERCENT IDLE = 13.060
PERCENT CRUISE = 31.502
PERCENT ACCELERATION = 29.158
PERCENT DECELERATION = 26.303

are over 52.5 mph. This is less than half of the estimate from the SRL five-city composite. The big difference in the percentages could be due in part to the fact that 26% of the total 7.486 miles of the UDDS are freeway miles while 32% of the total survey miles in all five cities were freeway travelled miles. This large difference in the freeway percentages results from a difference in SRL's and EPA's definition of urban area. SRL included in their urban definition the entire metropolitan area that comprised both the central city and the suburban areas. EPA defined urban as a six mile radius area from the Central Business District. An increase in the amount of driving outside the central city would result in an increase in the percentage of freeway and thus high speed travel.

C. GM Chase Car Survey

The GM Chase Car survey was conducted in 1974 in twelve major metropolitan areas in the United States.[7] Chase cars were instrumented to monitor several driving parameters while following a vehicle and duplicating its operation. The data was primarily grouped according to the different road types travelled on, some of which were rural, urban, highway, and non-highway type of roads. In this section, the amount of driving over 50 mph monitored by the GM chase cars on each of these four road types will be presented and discussed. The data will also be compared to the same statistics computed from both the UDDS and the HDDS wherever this comparison can be made. However, final conclusions must not be drawn from these comparison since an extensive EPA study revealed that for several reasons the GM Chase Car survey results were not representative of the national driving pattern.[8,9]

The percentage of miles and time spent in various speed bands for the HDDS and GM chase car data are presented in Tables 8 and 9. Tables 10 and 11 compare the GM urban data with the EPA UDDS data for the same speed bands. The percentages for speeds over 52.5 mph derived from these tables for the EPA schedules will not correspond exactly to the amounts reported in the previous sections. The reason for this difference is because GM developed a computer program to evaluate the chase car data and this same program was employed to analyze the EPA schedules. The percentages provided in the previous sections were derived by a simple count of the speed points over 52.5 mph divided by the total number of points. A more comprehensive description of the GM chase car and EPA comparison techniques can be found in Reference 9.

Tables 8 and 9 indicate that GM monitored a larger amount of vehicle operation over 52.5 mph than is reflected by the HDDS. The same observation can be made from Tables 10 and 11. The percent of miles and time spent in speeds greater than 52.5 mph for both EPA and GM are found directly below each table.

From Figures 5 through 7 we can extract the percent of miles travelled at speeds greater than 52.5 mph for highways, non-highways and all road

Table 8

Percentage of Miles Spent in Speed Bands

mph ± 2.5 mph	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
EPA HDDS	.05	.08	.10	.22	.24	.68	1.47	3.54	8.11	26.41	17.72	38.02	3.37	0	0	0
GM Rural RT	.01	.10	.21	.39	.85	1.26	2.22	3.34	5.71	8.59	16.08	24.68	20.08	9.14	5.37	1.24

Percent Miles >52.5 mph	EPA HDDS	GM Rural RT
	41.39	60.51

Table 9

Percentage of Time Spent in Speed Bands

mph ± 2.5 mph	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
EPA HDDS	4.07	.51	.38	.64	.51	1.14	2.16	4.57	9.02	26.43	16.26	31.64	2.67	0	0	0
GM Rural RT	1.25	.96	1.01	1.27	2.07	2.46	3.62	4.65	6.97	9.33	15.68	22.06	17.13	6.92	3.79	.83

Percent Time >52.5 mph	EPA HDDS	GM Rural RT
	34.3	50.73

Source: Elwood Vogt, "Analysis of GM Chase Car Data," EPA Report.

Table 10

Percentage of Miles Spent in Speed Bands

mph ± 2.5 mph	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
EPA UDDS	.84	2.38	3.78	8.68	18.53	27.90	9.77	6.68	1.27	4.46	8.61	7.10				
GM Urban RT	.62	1.84	3.75	5.84	8.52	13.88	16.47	14.91	10.80	7.57	7.02	6.07	2.31	.35	.06	.01

Percent Miles >52.5 mph

EPA UDDS	GM Urban RT
7.10	8.80

Table 11

Percentage of Time Spent in Speed Bands

mph ± 2.5 mph	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
EPA UDDS	24.56	6.03	5.81	9.59	16.06	20.28	5.96	3.63	.58	1.82	3.20	2.47				
GM Urban RT	16.79	6.01	7.34	8.18	9.38	12.51	12.59	9.91	6.32	3.95	3.31	2.62	.92	.13	.02	

Percent Time >52.5 mph

EPA UDDS	GM Urban RT
2.47	3.69

Source: Elwood Vogt, "Analysis of GM Chase Car Data," EPA Report.

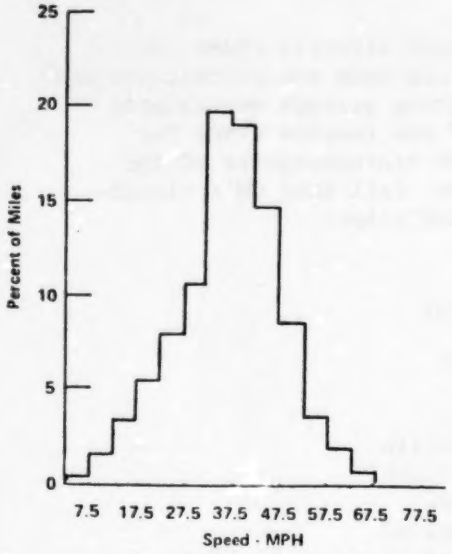

Figure 5

Percent of Miles Spent in
Speed Bands-Non-Highway Driving

% miles > 52.5 mph = 6.5%

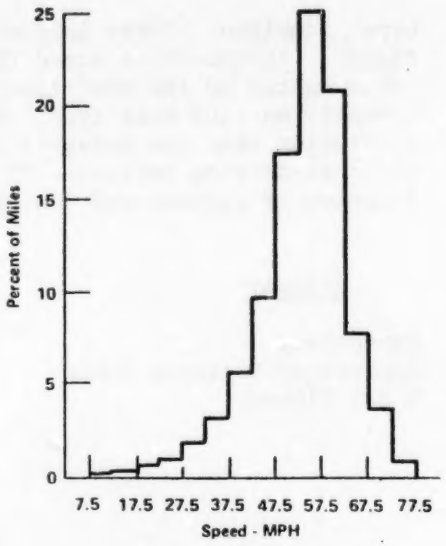

Figure 6

Percent of Miles Spent in
Speed Bands-Highway Driving

% miles > 52.5 mph = 59%

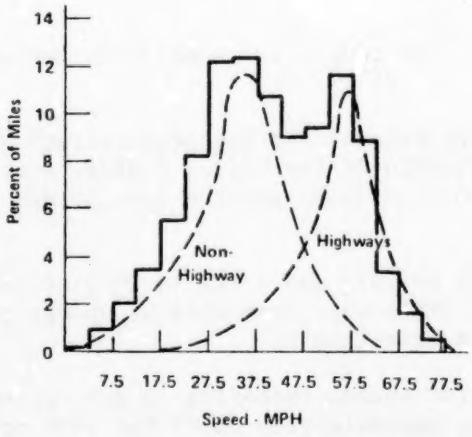

Figure 7

Percent of Miles Spent in Speed Bands

% miles > 52.5 mph = 26%

Source: Johnson, Formenti, Gray, and Peterson, "Measurement of Motor Vehicle Operation Pertinent to Fuel Economy," SAE, 750003.

types combined. These percentages can be found directly under each figure. It should be noted that these distributions and percentages are not weighted by the fraction of national driving mileage accumulated annually on each road type. This was one of the reasons given for concluding that the survey's results were not representative of the national driving pattern. The road types that fall into GM's classification of highway and non-highway are listed below:

Highway	Non-Highway
Expressway	Suburban Artery
Expressway-Business Route	Rural Unpaved
Rural Highway	Urban Artery
	Strip Commercialism
	Surburban - No Curb
	Surburban - Curb
	Surburban - Unpaved
	Central Business District Parking
	No Parking
	Urban
	Shopping Center/Parking Lot

The highway road types appear to be comparable to the HDDS's road representation. The percent of miles travelled over 52.5 mph, 59%, estimated from Figure 6 for highway driving is actually very close to the 60.5% estimated from Table 8 for rural driving. Therefore, a comparison of GM highway data to the HDDS also indicates that GM monitored more high speeds than the EPA schedule accounts for.

Conclusions

The main conclusions of this report for vehicle operation over 50 mph are:

1. Data reported by the Federal Highway Administration (FHwA) indicate that for free-flowing traffic in the United States, over half of the passenger cars travelled at a speed greater than 50 mph in both 1974 and 1975.

2. Approximately 54.8% in 1974 and 63.1% in 1975 of the total U.S. Vehicle Miles Travelled (VMT) were conducted at speeds greater than 50 mph when the traffic was free-flowing.

3. The percent of VMT at speeds exceeding 50 mph for rural roads (with free-flowing traffic) is approximately 68.8% for 1974 and 77.0% for 1975. These percentages are significantly larger than the 54.0% for the EPA Highway Dynamometer Driving Schedule (HDDS). Since the HDDS is basically a free-flowing traffic cycle it appears, that the HDDS does not include sufficient real-world high speeds. This is due largely to the fact that the HDDS represents rural driving in the southeastern part

of Michigan and a freeway segment in northern Ohio soon after the enforcement of the 55 mph speed limit in Ohio. The driver flowed with the traffic when possible, and when he was not in traffic he purposely maintained a maximum speed of 55 mph in order to reflect the anticipated nationwide 55 mph speed limit.

4. The data from a study conducted by Scott Research Laboratories reveals that 10% of the average urban operation time is spent in speeds greater than 52.5 mph. The EPA Urban Dynamometer Driving Schedule (UDDS), representative of Los Angeles city driving in 1969, has 3.87% of its speed points over 52.5 mph, less than half of SRL's estimate.

5. A comparison of the GM chase car data to the UDDS and HDDS indicates that GM monitored more high speeds than the EPA schedules account for.

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8. Vogt, Elwood, "Analysis of GM Chase Car Data," EPA Report.

9. Vogt, Elwood, W., "Comparison of the Vehicle Operational Characteristics of the EPA highway Dynamometer Driving Schedule with the Rural Driving Data Collected by the GM Chase Car Survey," EPA, September 1975.